CLAIMS

What is claimed is:

1. A semiconductor device comprising an insulating film, the insulating film being formed of an insulative inorganic material as a main material, the insulative inorganic material containing silicon and oxygen, and the insulating film containing hydrogen atoms,

wherein at least a part of the absorbance of infrared radiation of which wave number is in the range of 830 to 900 cm^{-1} is less than both the absorbance of infrared radiation at the wave number of 830 cm^{-1} and the absorbance of infrared radiation at the wave number of 900 cm^{-1} when the insulating film to which an electric field has never been applied is measured by means of Fourier Transform Infrared Spectroscopy at room temperature, and

wherein, in the case where the absolute value of the difference between the absorbance of infrared radiation at the wave number of 830 cm^{-1} and the absorbance of infrared radiation at the wave number of 770 cm^{-1} is defined as A and the absolute value of the difference between the absorbance of infrared radiation at the wave number of 900 cm^{-1} and the absorbance of infrared radiation at the wave number of 990 cm^{-1} is defined as B, then A and B satisfy the relation: A/B is 1.8 or more.

2. The semiconductor device as claimed in claim 1, wherein the insulative inorganic material further includes at least one of nitrogen, hafnium, zirconium, and aluminum in addition to silicon and oxygen.

3. The semiconductor device as claimed in claim 1, wherein each hydrogen atom in at least a part of the hydrogen atoms is replaced by a deuterium atom.

4. The semiconductor device as claimed in claim 1, wherein the average thickness of the insulating film is 10 nm or less.

5. The semiconductor device as claimed in claim 1, wherein the semiconductor device includes a gate electrode and a gate insulating film for insulating the gate electrode, and the gate insulating film is formed from the insulating film.

6. The semiconductor device as claimed in claim 5, wherein the semiconductor device is adapted to be used under the condition that a gate voltage is applied to the gate electrode so that the electric field intensity in the insulating film is 10 MV/cm or less.

7. The semiconductor device as claimed in claim 5, wherein a leakage current passing through the gate insulating film in the thickness direction thereof that is measured in a state that the gate voltage is applied to the gate electrode so that the electric field intensity in the insulating film is 5 MV/cm or less is 9×10^{-9} A/cm^2 or less.

8. The semiconductor device as claimed in claim 5, wherein the total amount of electrical charges passing through the gate insulating film in the thickness direction thereof until a soft breakdown occurs in the insulating film is 40 C/cm^2 or more.

9. The semiconductor device as claimed in claim 5, wherein the total amount of electrical charges passing through the gate insulating film in the thickness direction thereof until a hard breakdown occurs in the insulating film is 100 C/cm^2 or more.

10. The semiconductor device as claimed in claim 1, wherein the Fourier Transform Infrared Spectroscopy is

Multi-Reflection Attenuated Total Reflection Method.

11. An electronic device comprising the semiconductor device defined by claim 1.

12. An electronic apparatus comprising the electronic device defined by claim 11.